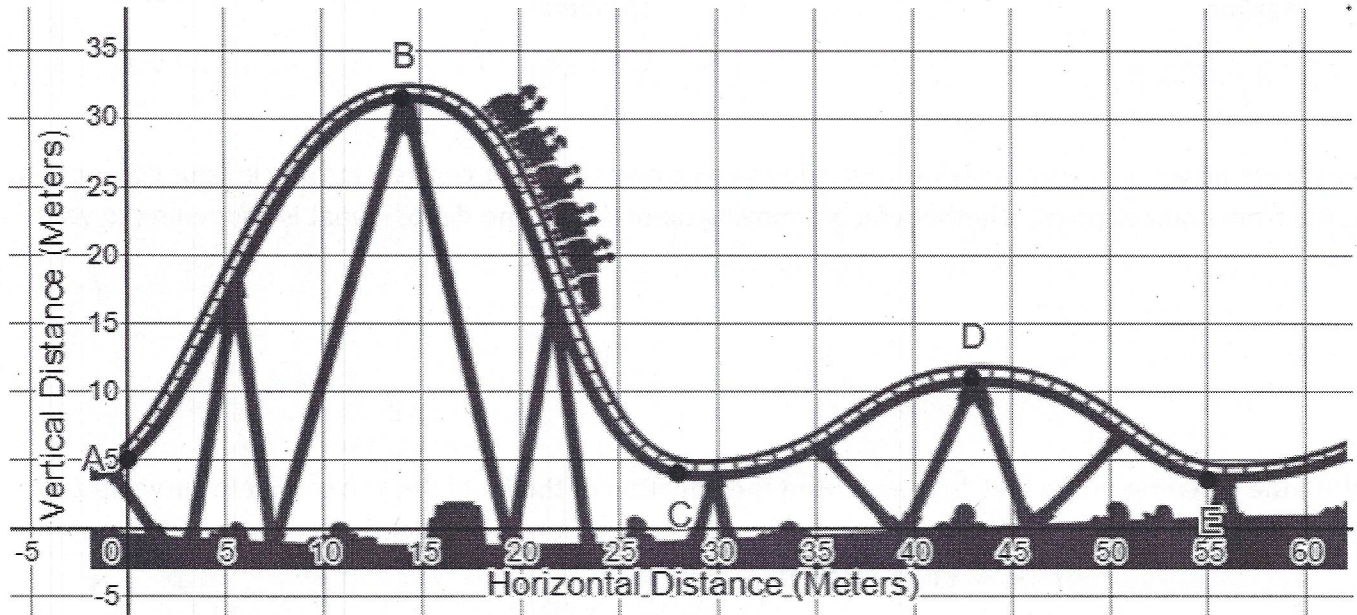


## Function of a Ride

Below you will find a graph comparing the horizontal and vertical distances of a portion of the roller coaster track, with key points labeled. Consider the point A to be the beginning of the roller coaster track. Also consider curves that look like parabolas, are parabolas (assume the curves are smooth).



stakeholder management | Productivity Steps  
<https://images.app.goo.gl/3sieQyMtH3sbWoRk6>

View this graph in Desmos at: <https://www.desmos.com/calculator/opjkgsgtma>

1. What is the domain and range of the function?

Domain  
 $0 < x < 55$

Range  
 $0 < y < 32$

2. Find the intervals where the function is increasing and decreasing.

Increasing  
 $(0, 15)$   $(30, 45)$   $(52, \infty)$

Decreasing  
 $(15, 28)$   $(45, 55)$

How did you find the intervals?

I looked at where the intervals go up and down

3. At what point on the coaster would you be going the fastest? The slowest? Explain why you chose these points.

Fastest at  
(15, 28)

Slowest at  
(0, 14)

It goes down the steepest and quickest  
4. What are the maxima and minima of the function?

It takes a long time to go up

Maxima  
(15, 32)

Minima  
(55, 4)

5. Where would you scream? Describe your ride as you travel the roller coaster. Include in your description your trip from point to point, whether you are moving up or down, and discuss what is happening to your speed. I would scream when the roller coaster is going down at the first drop because it would go down the fastest out of the whole ride. The next rise would be at a moderate speed since it's quicker than the first rise. The second drop would be quicker than the second rise. Out of the whole roller coaster I would enjoy the first drop because everything else is boring.

6. Write the equation of the first "scream"! Find the equation of the first hill – the complete curve up and down again, from point A – C. Show all your work, with explanations when needed.

$$y_1 \sim -0.0130633(14)^2 + 0.557607(14) + 10.8815 \text{ -- First scream}$$

I would only scream once

$$y \sim -0.137245(x)^2 + 3.80714(x) + 5$$

7. Looking at the first hill and its equation, how HIGH off the ground would you be after you have traveled 5 meters horizontally. Show your work and explain how you got the answer. How does the predicted height compare to the actual height of the roller coaster at that point?

$$\text{Predict} = y_1 \sim -0.137245(5)^2 + 3.80714(5) + 5 = 20.604575 \text{ m}$$

Actual = 16 m

The predicted is higher



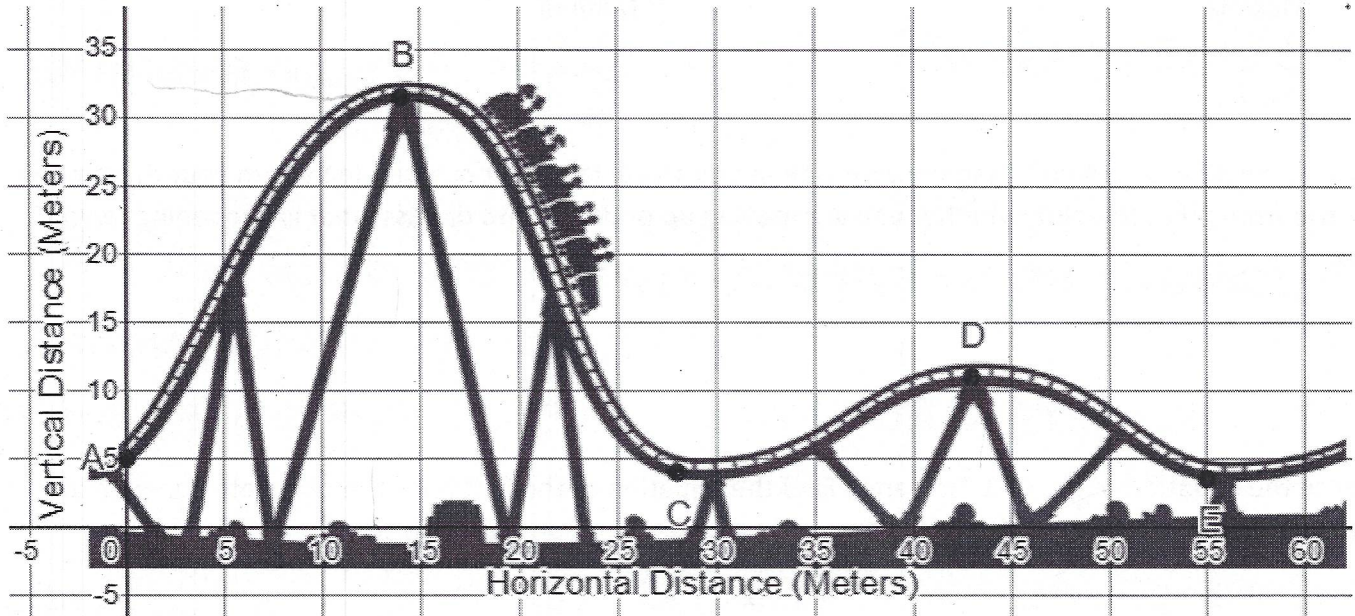
# STUDENT B

Name \_\_\_\_\_

Date \_\_\_\_\_

## Function of a Ride

Below you will find a graph comparing the horizontal and vertical distances of a portion of the roller coaster track, with key points labeled. Consider the point A to be the beginning of the roller coaster track. Also consider curves that look like parabolas, are parabolas (assume the curves are smooth).



stakeholder management | Productivity Steps  
<https://images.app.goo.gl/3sieQyMtH3sbWoRk6>

View this graph in Desmos at: <https://www.desmos.com/calculator/opjkgsgtma>

Let  $A = (0, 5)$   
 $B = (14, 31)$   
 $C = (28, 4)$   
 $D = (43, 11)$   
 $E = (55, 4)$

1. What is the domain and range of the function?

Domain  $[0, 62.5]$

Range  $[4, 31]$

2. Find the intervals where the function is increasing and decreasing.

Increasing  $(0, 14), (28, 43), \text{ and } (55, 63)$

Decreasing  $(14, 28), \text{ and } (43, 55)$

How did you find the intervals?

By estimating the coordinates of the points and using them as the boundaries of where the coaster is going up and down.

3. At what point on the coaster would you be going the fastest? The slowest? Explain why you chose these points.

Fastest at B to C

Slowest at A to B

A to B is the steepest uphill and B to C is the steepest downhill.

4. What are the maxima and minima of the function?

Maxima

B (14, 31) Absolute  
D (43, 11)

Minima

C (28, 4)  
E (55, 4) > Both absolute

5. Where would you scream? Describe your ride as you travel the roller coaster. Include in your description your trip from point to point, whether you are moving up or down, and discuss what is happening to your speed.

Scream at B - highest point / top of a hill

A to B - going up slowly

B to C - going down quickly

C to D - going up medium

D to E - going down quick

6. Write the equation of the first "scream"! Find the equation of the first hill - the complete curve up and down again, from point A - C. Show all your work, with explanations when needed.

Using points for A, B, and C, regression on Desmos gives  $y = -.035204x^2 + 3.75x + 5$

7. Looking at the first hill and its equation, how HIGH off the ground would you be after you have traveled 5 meters horizontally. Show your work and explain how you got the answer. How does the predicted height compare to the actual height of the roller coaster at that point?

Let  $x = 5$  on Desmos. The line intersects the regression graph of the curve at 20.37 meters. The actual height is closer to 17 meters, so the regression is higher.



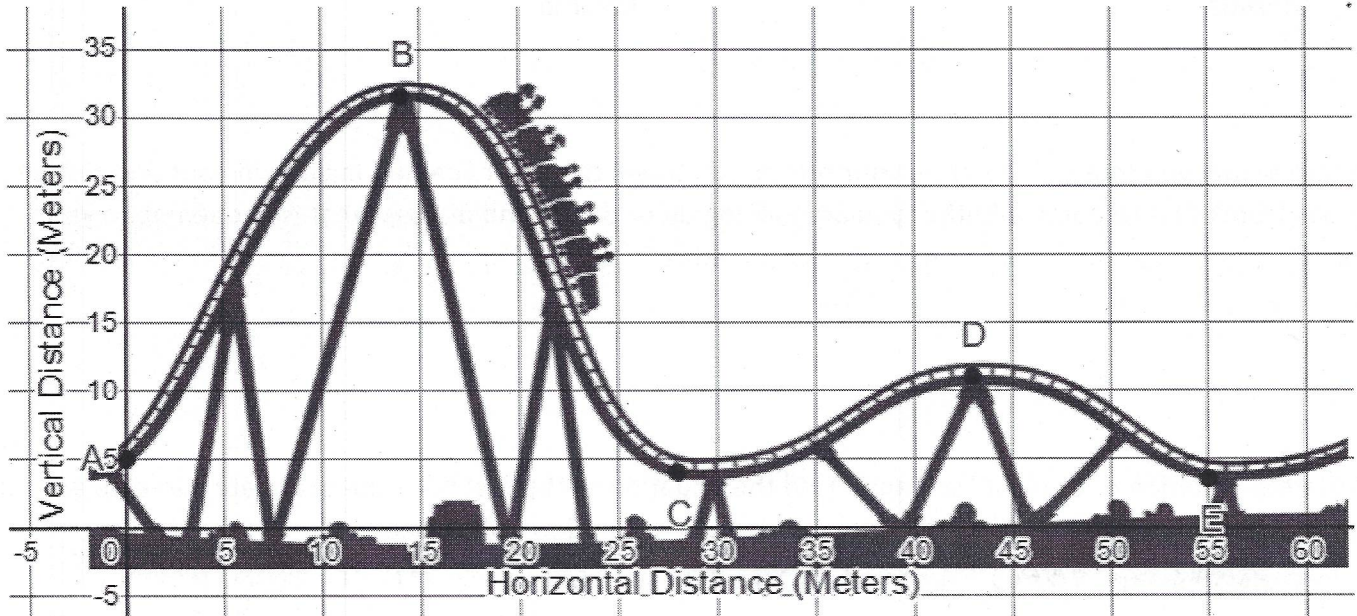
# STUDENT C

Name \_\_\_\_\_

Date \_\_\_\_\_

## Function of a Ride

Below you will find a graph comparing the horizontal and vertical distances of a portion of the roller coaster track, with key points labeled. Consider the point **A** to be the beginning of the roller coaster track. Also consider curves that look like parabolas, are parabolas (assume the curves are smooth).



stakeholder management | Productivity Steps  
<https://images.app.goo.gl/3sieQyMtH3sbWoRk6>

View this graph in Desmos at: <https://www.desmos.com/calculator/opjksgtma>

1. What is the domain and range of the function?

Domain

$\mathbb{R}$

Range

$1 \leq 32$

2. Find the intervals where the function is increasing and decreasing.

Increasing  $(0, 5) \cup (14, 31.5)$  and  $(28.2, 4) \cup (43, 11)$

Decreasing  $(14, 31.5) \cup (28.2, 4)$  and  $(43, 11) \cup (55, 3.5)$

How did you find the intervals?

Those are were the turning points are

3. At what point on the coaster would you be going the fastest? The slowest? Explain why you chose these points.

Fastest at  
B, speed increases  
as you drop

Slowest at  
A, longer distance

4. What are the maxima and minima of the function?

Maxima

Minima

5. Where would you scream? Describe your ride as you travel the roller coaster. Include in your description your trip from point to point, whether you are moving up or down, and discuss what is happening to your speed. From point B to C as the speed increases while going down the hill

6. Write the equation of the first "scream"! Find the equation of the first hill – the complete curve up and down again, from point A – C. Show all your work, with explanations when needed.

$$y = -0.135797x^2 + 3.79402x + 5$$

$$A = -0.135797$$

$$B = 3.79402$$

$$C = 5$$

7. Looking at the first hill and its equation, how HIGH off the ground would you be after you have traveled 5 meters horizontally. Show your work and explain how you got the answer. How does the predicted height compare to the actual height of the roller coaster at that point?

$$y = (-0.135797)(5)^2 + (3.79402)(5) + 5$$

$$x = 5$$

$$y = 20.575175$$

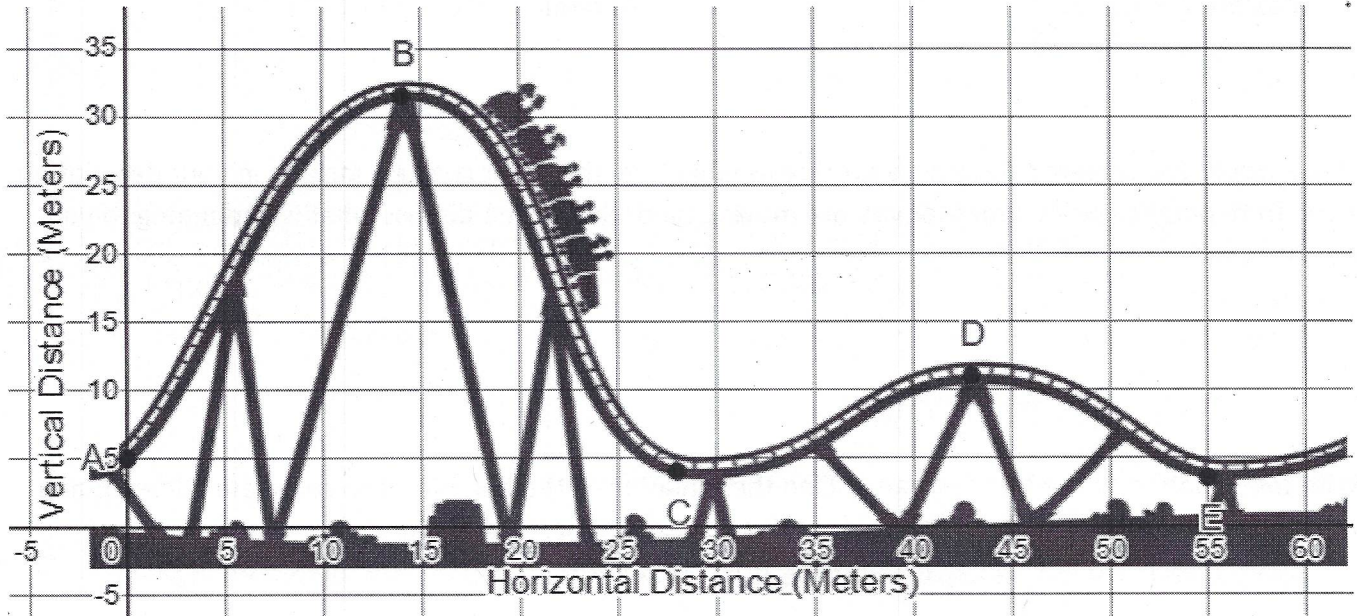
# STUDENT D

Name \_\_\_\_\_

Date \_\_\_\_\_

## Function of a Ride

Below you will find a graph comparing the horizontal and vertical distances of a portion of the roller coaster track, with key points labeled. Consider the point A to be the beginning of the roller coaster track. Also consider curves that look like parabolas, are parabolas (assume the curves are smooth).



stakeholder management | Productivity Steps  
<https://images.app.goo.gl/3sieQyMtH3sbWoRk6>

View this graph in Desmos at: <https://www.desmos.com/calculator/opjkgsgtma>

1. What is the domain and range of the function?

Domain  $\mathbb{R}^-$

Range  $\{y | -1 \leq y \leq 32\}$

2. Find the intervals where the function is increasing and decreasing.

Increasing  $(5, 13) (30, 43) (56, 62)$

Decreasing  $(13, 30) (43, 56)$

How did you find the intervals? By looking at the graph to see where the graph was higher and lower.



3. At what point on the coaster would you be going the fastest? The slowest? Explain why you chose these points.

Fastest at (14, 26) because it would be going down from the highest point.

Slowest at (5, 26) because the roller coaster is building momentum.

4. What are the maxima and minima of the function?

Maxima (14, 32)

Minima (27, 4) (55, 4)

5. Where would you scream? Describe your ride as you travel the roller coaster. Include in your description your trip from point to point, whether you are moving up or down, and discuss what is happening to your speed. I would scream as we went down from the highest point because it would be at the tippy toppest of the roller coaster. Point A to B is going up, B to C is down, C to D is up, D to E is down.

6. Write the equation of the first "scream"! Find the equation of the first hill – the complete curve up and down again, from point A – C. Show all your work, with explanations when needed.

$$-0.0129442(15)^2 + 0.55741(15) + 10.7166$$

7. Looking at the first hill and its equation, how HIGH off the ground would you be after you have traveled 5 meters horizontally. Show your work and explain how you got the answer. How does the predicted height compare to the actual height of the roller coaster at that point?

30 feet in the air.